

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

| | |
|---|---|
| Date of mailing (day/month/year) 03 August 2001 (03.08.01) | Applicant's or agent's file reference 10541-029 |
| International application No. PCT/US00/26522 | Priority date (day/month/year) 27 September 1999 (27.09.99) |
| International filing date (day/month/year) 27 September 2000 (27.09.00) | |
| Applicant ZORATTI, Paul, K. et al | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

20 April 2001 (20.04.01)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
|--|---|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer Nestor Santesso Telephone No.: (41-22) 338.83.38 |
|--|---|

INTERNATIONAL SEARCH REPORT

 International application No.
PCT/US00/26522

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :B60R 21/32

US CL :280/735; 180/274; 340/436

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 280/735; 180/274; 340/436; 701/45

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| X ---- | US 5,419,407 A (MEYER et al.) 30 May 1995 (30.05.95), entire document. | 1,2,4-7 ---- |
| Y | | 3,8-14 |
| Y | US 5,428,534 A (WETZEL et al.) 27 June 1995 (27.06.95), entire document. | 8-20 |
| Y | US 5,583,476 A (LANGFORD) 10 December 1996 (10.12.96), entire document. | 3,8-20 |
| A | US 5,445,412 A (GILLIS et al.) 29 August 1995 (29.08.95). | 1,8,15 |
| A | US 5,797,623 A (HUBBARD) 25 August 1998 (25.08.98). | 1,8,15 |
| A,E | US 6,169,479 B (BORAN et al.) 02 January 2001 (02.01.01). | 1,8,15 |



Further documents are listed in the continuation of Box C.



See patent family annex.

| | |
|---|--|
| * Special categories of cited documents: | *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| *A* document defining the general state of the art which is not considered to be of particular relevance | *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| *E* earlier document published on or after the international filing date | *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | *G* document member of the same patent family |
| *O* document referring to an oral disclosure, use, exhibition or other means | |
| *P* document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search

01 MARCH 2001

Date of mailing of the international search report

13 MAR 2001

 Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

PETER ENGLISH

Telephone No. (703) 308-1113

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/26522

B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

EAST

search terms: sensor, sensing, impact, crash, crush, collision, resistance, deformation, accelerometer, acceleration, air bag, airbag, gas bag, flexible potentiometer, piezoelectric, fiber optic

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 April 2001 (05.04.2001)

PCT

(10) International Publication Number
WO 01/23224 A1

(51) International Patent Classification⁷: **B60R 21/32**

(US). CHI, David, Ming [US/US]; 2926 Courville Drive, Bloomfield Hills, MI 48302 (US).

(21) International Application Number: PCT/US00/26522

(22) International Filing Date:
27 September 2000 (27.09.2000)

(74) Agents: OBERHOLTZER, Steven, L.; Brinks Hofer Gilson & Lione, 1000 Victors Way, Suite 100, Ann Arbor, MI 48108 et al. (US).

(25) Filing Language: English

(81) Designated States (*national*): DE, GB, JP, US.

(26) Publication Language: English

(84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

(30) Priority Data:
60/156,165 27 September 1999 (27.09.1999) US

(71) Applicant (*for all designated States except US*): VISTEON GLOBAL TECHNOLOGIES, INC. [US/US]; Suite 728, Parklane Towers East, 1 Parklane Boulevard, Dearborn, MI 48126 (US).

Published:

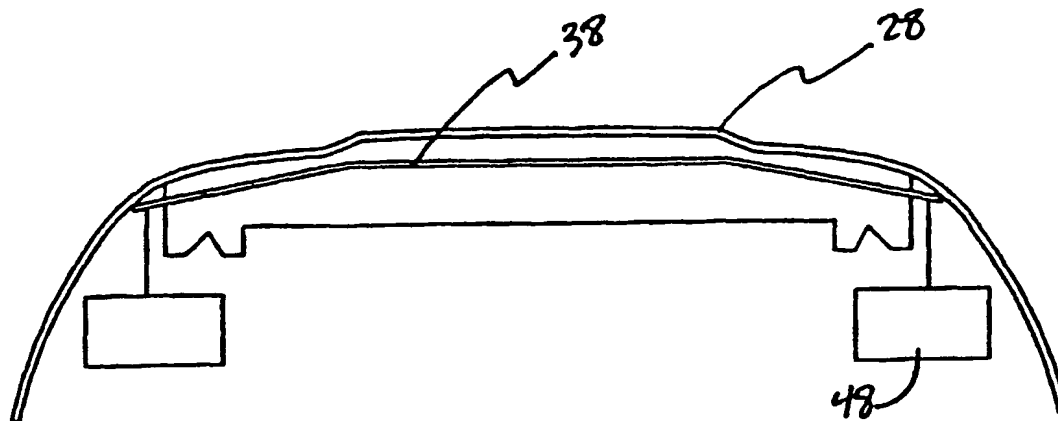
- With international search report.
- Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): ZORATTI, Paul, K. [US/US]; 13925 Monarch Drive, South Lyon, MI 48178

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: VEHICLE IMPACT SENSING SYSTEM



(57) Abstract: A vehicle impact sensing system for detecting impact events to a vehicle, and allowing deployment decisions of passive restraint devices based on information gathered and relayed regarding such impact events. The sensing system includes one or more sensor elements capable of directly detecting vehicle deformation occurring as a consequence of the impact event. The sensor elements generate an output that varies upon deformation of the element. The sensor elements are in communication with a restraints control module. Upon deformation of the sensor element, the control module receives impact signals from the sensor elements based upon the altered output, and discriminates between impact events that warrant deployment of a passive restraint, such as a side air bag, and those that do not. The control module utilizes information gathered from the sensor elements to make deployment decisions, such as which restraint to deploy and the appropriate degree of deployment.

WO 01/23224 A1

WE CLAIM:

1. A vehicle impact sensing system for detecting vehicular impacts causing structural elements of a vehicle to deform, comprising, in combination,

5 at least one bend sensitive resistance element disposed along a structural element of said vehicle and being capable of generating a variable resistance output,

at least one deployable restraint disposed within said vehicle, and

10 a controller in electrical communication with said at least one bend sensitive resistance element, said controller being capable of detecting changes in said variable resistance output.

2. The vehicle impact sensing system of claim 1 wherein said at least one bend sensitive resistance element is a single elongate sensor disposed on a flexible substrate.

3. The vehicle impact sensing system of claim 1 wherein said at least one bend sensitive resistance element comprises a plurality of individual sensors horizontally disposed on a flexible substrate,

whereby said plurality of individual sensors is capable of providing a degree of azimuthal resolution of said vehicular impacts.

4. The vehicle impact sensing system of claim 1 wherein said structural element of said vehicle is a structural reinforcement beam of a door of said vehicle.

5. The vehicle impact sensing system of claim 1 wherein said structural element of said vehicle is a bumper of said vehicle.

6. The vehicle impact sensing system of claim 1 wherein said at least one passive restraint is a side airbag.

7. The vehicle impact sensing system of claim 1 wherein said at least one passive restraint is a pedestrian airbag.

8. A vehicle impact sensing system for detecting vehicular impacts causing structural elements of a vehicle to deform, comprising,

5 a plurality of deformation sensor elements horizontally disposed along a structural element of said vehicle, each of said plurality being capable of generating a variable output signal,

at least one deployable restraint disposed within said vehicle, and

10 a controller in electrical communication with said plurality of deformation sensor elements and said at least one deployable restraint, said controller being capable of detecting changes in said variable output signal,

whereby said plurality of deformation sensor elements is capable of providing a degree of azimuthal resolution of said vehicular impacts.

9. The vehicle impact sensing system of claim 8 wherein said 15 plurality of deformation sensor elements is a plurality of elongate bend sensitive resistance elements.

10. The vehicle impact sensing system of claim 8 wherein said variable output signal of said deformation sensor element is the resistance of said deformation sensor element.

20 11. The vehicle impact sensing system of claim 8 wherein said plurality of deformation sensor elements is a plurality of piezoelectric cables.

12. The vehicle impact sensing system of claim 8 wherein said plurality of deformation sensor elements is a plurality of optical fibers and said variable output is the transmission of light.

25 13. The vehicle impact sensing system of claim 8 wherein said structural element of said vehicle is a structural reinforcement beam of a door of said vehicle.

14. The vehicle impact sensing system of claim 8 wherein said structural element of said vehicle is a bumper of said vehicle.

15. A vehicle impact sensing system for detecting vehicular impacts causing structural elements of a vehicle to deform, comprising, in combination:

5 a plurality of deformation sensor elements horizontally disposed along a structural element of said vehicle, each of said plurality being capable of generating a variable output signal,

at least one deployable restraint disposed within said vehicle,

at least one accelerometer sensor, and

10 a controller in electrical communication with said plurality of deformation sensor elements, said accelerometer sensor and said at least one deployable restraint, said controller being capable of detecting changes in said variable output and deploying said at least one passive restraint.

16. The vehicular impact sensing system of claim 15 wherein said at least one accelerometer sensor is oriented to detect acceleration in a longitudinal direction of said vehicle.

17. The vehicular impact sensing system of claim 15 wherein said at least one accelerometer sensor is oriented to detect acceleration in a lateral direction of said vehicle.

18. The vehicle impact sensing system of claim 15 wherein said at least one passive restraint is a side airbag.

19. The vehicle impact sensing system of claim 15 wherein said at least one passive restraint is a front airbag.

20. The vehicle impact sensing system of claim 15 wherein said at least one passive restraint is a pedestrian airbag.

PATENT COOPERATION TREATY

PCT

REC. 21 JAN 2002

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|--|--|---|
| Applicant's or agent's file reference 10541-029 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US00/26522 | International filing date (day/month/year) 27 SEPTEMBER 2000 | Priority date (day/month/year) 27 SEPTEMBER 1999 |
| International Patent Classification (IPC) or national classification and IPC IPC(7): B60R 21/32 and US Cl.: 280/735; 180/274; 340/436 | | |
| Applicant VISTEON GLOBAL TECHNOLOGIES, INC. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

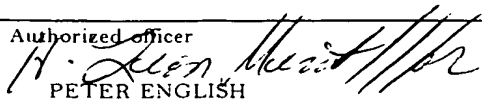
2. This REPORT consists of a total of 4 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

| | |
|--|---|
| Date of submission of the demand 20 APRIL 2001 | Date of completion of this report 20 DECEMBER 2001 |
| Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 | Authorized officer  PETER ENGLISH |
| Facsimile No. (703) 305-3230 | Telephone No. (703) 308-1113 |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/26522

I. Basis of the report**1. With regard to the elements of the international application:***☒ the international application as originally filed☒ the description:

pages 1-14 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the claims:

pages 15-19 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the drawings:

pages 1-3 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the sequence listing part of the description:

pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. ☒ The amendments have resulted in the cancellation of:**☒ the description, pages NONE☒ the claims, Nos. NONE☒ the drawings, sheets/fig NONE**5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/26522

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

| | | | |
|-------------------------------|--------|----------------------|-----|
| Novelty (N) | Claims | <u>3, 5 and 7-20</u> | YES |
| | Claims | <u>1, 2, 4 and 6</u> | NO |
| Inventive Step (IS) | Claims | <u>NONE</u> | YES |
| | Claims | <u>1-20</u> | NO |
| Industrial Applicability (IA) | Claims | <u>1-20</u> | YES |
| | Claims | <u>NONE</u> | NO |

2. citations and explanations (Rule 70.7)

Claims 1, 2, 4 and 6 lack novelty under PCT Article 33(2) as being anticipated by Meyer et al. (US 5,419,407). Meyer et al. discloses a vehicle impact sensing system comprising: a deformation sensor 1 comprised of force sensing resistor (FSR) sensors 7.1, 7.2 (see column 3, lines 52-63) mounted on a reinforcement beam 2 of a side door (see column 3, lines 17-19); a side air bag 6; and a controller 5 for detecting changes in the resistance of the FSR sensors 7.1, 7.2 and for activating the air bag 6.

Claims 5 and 7 lack an inventive step under PCT Article 33(3) as being obvious over Meyer et al. (US 5,419,407). Meyer et al. (see explanation above) fails to teach mounting the sensor on a vehicle bumper for actuating a pedestrian air bag. Since it is well-known to control pedestrian air bags by bumper-mounted sensors, it would have been obvious to mount the sensor of Meyer et al. on a vehicle bumper for actuating a pedestrian air bag in order to protect pedestrians that are struck by the vehicle. Further, such a modification involving a mere shift in location (i.e., from the side door to the bumper) is considered to be obvious.

Claims 3 and 8-14 lack an inventive step under PCT Article 33(3) as being obvious over Meyer et al. (US 5,419,407) in view of Langford (US 5,583,476). Meyer et al. (see explanation above) fails to teach the specific sensor used by applicant. As discussed in applicant's own disclosure, Langford teaches a flexible potentiometer that has the structure of applicant's deformation sensor. It would have been obvious to modify Meyer et al. by replacing the deformation sensor with that taught by Langford because Langford's sensor operates more consistently and predictably.

Claims 8-20 lack an inventive step under PCT Article 33(3) as being obvious over Wetzel et al. (US 5,428,534) in view of Langford (US 5,583,476). Wetzel et al. discloses a safety system comprising a controller 5 that controls an air bag 4 in response to signals from a deformation sensor 3 and an acceleration sensor (Continued on Supplemental Sheet.)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/26522

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

6. Wetzel et al. fails to teach the specific sensor used by applicant. As discussed in applicant's own disclosure, Langford teaches a flexible potentiometer that has the structure of applicant's deformation sensor. It would have been obvious to modify Wetzel et al. by replacing the deformation sensor with that taught by Langford because Langford's sensor operates more consistently and predictably.

NEW CITATIONS

NONE

REPLACED BY
ART 34 AMBT

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 25 APR 2002

WIPO PCT

10/070884

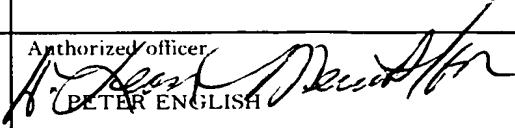
| | | |
|--|---|---|
| Applicant's or agent's file reference 10541-029 | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US00/26522 | International filing date (day/month/year) 27 SEPTEMBER 2000 | Priority date (day/month/year) 27 SEPTEMBER 1999 |
| International Patent Classification (IPC) or national classification and IPC IPC(7): B60R 21/32 and US Cl.: 280/735; 180/274; 340/436 | | |
| Applicant VISTEON GLOBAL TECHNOLOGIES, INC. | | |

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This **REPORT** consists of a total of 4 sheets.
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
 These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

CORRECTED VERSION

| | |
|--|---|
| Date of submission of the demand 20 APRIL 2001 | Date of completion of this report 20 DECEMBER 2001 |
| Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 | Authorized officer  PETER ENGLISH |
| Facsimile No. (703) 305-3230 | Telephone No. (703) 308-1113 |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/26522

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed☒ the description:

pages _____ (See Attached) _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the claims:

pages _____ (See Attached) _____, as originally filed

pages _____, as amended (together with any statement) under Article 19

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the drawings:

pages _____ (See Attached) _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the sequence listing part of the description:

pages _____ (See Attached) _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages _____ NONE _____☒ the claims, Nos. _____ NONE _____☒ the drawings, sheets/fig _____ NONE _____5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/26522

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

| | | | |
|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-20</u> | YES |
| | Claims | <u>NONE</u> | NO |
| Inventive Step (IS) | Claims | <u>NONE</u> | YES |
| | Claims | <u>1-20</u> | NO |
| Industrial Applicability (IA) | Claims | <u>1-20</u> | YES |
| | Claims | <u>NONE</u> | NO |

2. citations and explanations (Rule 70.7)

Claims 1-14 lack an inventive step under PCT Article 33(3) as being obvious over Meyer et al. (US 5,419,407) in view of Langford (US 5,583,476). Meyer et al. discloses a vehicle impact sensing system comprising: a deformation sensor 1 comprised of force sensing resistor (FSR) sensors 7.1, 7.2 (see column 3, lines 52-63) mounted on a reinforcement beam 2 of a side door (see column 3, lines 17-19); a side air bag 6; and a controller 5 for detecting changes in the resistance of the FSR sensors 7.1, 7.2 and for activating the air bag 6. Meyer et al. fails to teach the specific sensor used by applicant. As discussed in applicant's own disclosure, Langford teaches a flexible potentiometer that has the structure of applicant's deformation sensor. It would have been obvious to modify Meyer et al. by replacing the deformation sensor with that taught by Langford because Langford's sensor operates more consistently and predictably. Meyer et al. (see explanation above) fails to teach mounting the sensor on a vehicle bumper for actuating a pedestrian air bag. Since it is well-known to control pedestrian air bags by bumper-mounted sensors, it would have been obvious to mount the sensor of Meyer et al. on a vehicle bumper for actuating a pedestrian air bag in order to protect pedestrians that are struck by the vehicle. Further, such a modification involving a mere shift in location (i.e., from the side door to the bumper) is considered to be obvious.

Claims 8-20 lack an inventive step under PCT Article 33(3) as being obvious over Wetzel et al. (US 5,428,534) in view of Langford (US 5,583,476). Wetzel et al. discloses a safety system comprising a controller 5 that controls an air bag 4 in response to signals from a deformation sensor 3 and an acceleration sensor 6. Wetzel et al. fails to teach the specific sensor used by applicant. As discussed in applicant's own disclosure, Langford teaches a flexible potentiometer that has the structure of applicant's deformation sensor. It would have been obvious to modify Wetzel et al. by replacing the deformation sensor with that taught by Langford because Langford's sensor operates more consistently and predictably.

(Continued on Supplemental Sheet.)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/26522

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

I. BASIS OF REPORT:

This report has been drawn on the basis of the description,
page(s) 1-14, as originally filed.
page(s) NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the claims,
page(s) NONE, as originally filed.
page(s) NONE, as amended under Article 19.
page(s) NONE, filed with the demand.
and additional amendments:
Pages 15-19, filed with the letter of 15 October 2001.

This report has been drawn on the basis of the drawings,
page(s) 1-3, as originally filed.
page(s) NONE, filed with the demand.
and additional amendments:
NONE

This report has been drawn on the basis of the sequence listing part of the description:
page(s) NONE, as originally filed.
pages(s) NONE, filed with the demand.
and additional amendments:
NONE

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

----- NEW CITATIONS -----
NONE